DOCUMENT RESUME

ED 156 621 95 SP 012 420

AUTHOR Ekstrom, Ruth B.
TITLE Relationships Between Teacher Aptitudes, Teaching Behaviors, and Pupil Outcomes.
INSTITUTION Educational Testing Service, Princeton, N.J.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE 22 Feb 78
NOTE 25p.; Paper presented at the Annual Meeting, American Association of Colleges for Teacher Education (Chicago, Illinois, February 22, 1978)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Academic Achievement; Aptitude; Behavior Patterns; *Classroom Research; Elementary Education; *Factor Analysis; Knowledge Level; *Teacher Behavior; Teacher Characteristics; *Teaching Styles

ABSTRACT

A model of elementary school teacher behavior affecting pupil outcomes is presented, and research based upon that model is discussed. A portion of the model, the relationship between teacher aptitudes and knowledge, teaching behavior, and pupil outcomes is focused upon. Aptitudes considered important included verbal and reasoning ability, memory, fluency, flexibility, and sensitivity. Forty two second grade and fifty five fifth grade teachers and the pupils to whom they taught mathematics and/or reading were studied. Classroom observation, tests of student cognitive, affective, achievement, and aptitude levels, and tests of teacher aptitude, affective, and cognitive style/content tests provided a data base for analysis. Relationships between the factors tested and instructional behavior are examined. Only cognitive style and one attitude component (level of aspiration) were found consistently related over both grade levels and subject. In addition, interaction between specific teacher characteristics, especially aptitude and instructional behavior, are suggested by the data. The importance of further research to the improvement of instructional behavior, curricular change, and teacher retention is suggested. Statistical data is appended. (MJB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Paper presented at the American Association of Colleges for Teacher Education annual meeting, Chicago, Illinois, February 22, 1978

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Relationships Between Teacher Aptitudes, Teaching Behaviors, and Pupil Outcomes

Ruth B. Ekstrom
Educational Testing Service

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY Ruth Ekstrom TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

ED156621

In this paper I will discuss the model which was developed in conjunction with a research project which looked at elementary school teachers and their pupils. In this model, we tried to identify a number of aptitudes which we thought were related to teaching behavior and, also, to identify teaching behaviors which might be expected to affect pupil outcomes. After I review this model with you, I will present the findings of our research. Then we can discuss the implications of both the model and our findings for teacher selection and retention. Later, in our discussion group, I will share with you copies of some of the tests which we used with teachers and with pupils and sample items from each of the other tests.

The Model. As you can see from the handout, the model is a complex one. I would like to focus on one part of it -- the relationship between teacher aptitudes and knowledge, teaching behavior, and pupil outcomes. This portion of the model is shown in the second figure in your handout.

In developing the model and the test battery, we reviewed previous research which suggested some important relationships between teacher aptitude and pupil achievement. Reviews of various models of the structure of intellect (Guilford, 1967; Carroll, 1974) and of the literature on cognitive factors (Ekstrom, 1973) suggested other relationships between aptitudes and teaching behavior. We theorized that there are some minimal aptitude levels that are necessary but not sufficient to produce the knowledge and behaviors for adequate teaching performance. In making our final choice of aptitudes

SP 012 420

to measure in this research, we concluded that verbal ability, reasoning ability, memory, fluency, and flexibility were likely to be important for teachers. We also hypothesized that the cognitive style called field dependence-independence, teaching skills, knowledge, and subject matter knowledge would be important.

Verbal aptitude was included not only because of its importance in earlier research but also because of the obvious relationship between this ability and the teacher's own reading skills. It is also fairly clear that teacher verbal ability is an important element in teacher to pupil communications. This aptitude is probably what is referred to as cognition of semantic units in Guilford's model. Carroll (1974) points out that long-term lexicosemantic memory is usually involved in tests measuring verbal aptitude. He points out that the algorithms and operations involved in tests for this and many other cognitive factors are related to many kinds of school learning.

Quantitative reasoning aptitude seemed likely to have the same relationship to mathematical skills as verbal aptitude has to reasoning skills. A skill closely related to quantitative aptitude, numerical facility, is treated in this study as teacher knowledge rather than aptitude. This decision can certainly be argued but the correlation of .37 between the measures selected for these two related areas suggests that these are not merely different names for the same skill (Ekstrom, 1974). While both involve long-term memory, in quantitative reasoning aptitude, as measured by the Mathematics Aptitude Test used in this study, abstract logical algorithms are retrieved rather than the number associations required in numerical facility tasks such as doing simple, near mechanical, computations. In the Guilford model, numerical facility is considered to be memory for symbolic implications while quantitative aptitude is described as cognition of semantic systems.

Two other aptitudes which are likely to be important in both mathematics and reading comprehension are logical and inductive reasoning. Not only is logical reasoning of fundamental importance in mathematics, it also plays an important role in reading, both in relation to developing the letter-sound correspondence important in decoding and in coping with the kinds of multiple-choice test items often used in measuring reading comprehension. In teacher performance, the importance of logical reasoning, as measured by the Nonsense Syllogisms test in this study, ranges from deciding which instructional approach will best meet a pupil's needs to deciding who most likely threw that spitball, while inductive reasoning should be helpful in conceptualizing as a group the indicators of need for different types of remediation. In the Guilford model, inductive reasoning is considered to include the cognition of symbolic and figural classes and systems while logical reasoning requires the evaluation of semantic relations. Carroll points out that logical reasoning requires retrieving the appropriate meanings and algorithms from long-term memory and then performing serial operations on them (a process similar to that required in quantitative aptitude) while induction requires a search through long-term memory for hypotheses and serial operations to construct new hypotheses. Given the all-pervasive relation between reasoning and teacher performance, we hypothesized that this aptitude might be at least as significant as verbal aptitude.

Memory was selected as another important teacher aptitude because of its basic relationship to most other cognitive factors. Additionally, the ability to recall the correct piece of information when it is needed seems basic in teaching performance. It was thought that, by including memory as a separate aptitude as well as other aptitudes which are partially dependent on memory, it might be possible to differentiate the relevant aptitude subcomponents

more exactly. Two types of memory were included in this study: (1) associative memory, or the ability to remember bits of unrelated materials, and (2) meaningful memory, or the ability to remember verbal material. Guilford defines meaningful memory as memory for semantic systems, while associate memory is memory for symbolic units.

The remaining teacher aptitudes are those kinds of divergent production sometimes called creativity.

Fluency is one of the most important divergent production aptitudes. Three kinds of fluency were included in this study. Research by Calvin Taylor and his colleagues (1967) has already shown the importance of associational and expressional fluency in relation to the ability to instruct others. Associational fluency involves the ability to produce words from a restricted area of meaning while expressional fluency involves the ability to think of word groups or phrases. Obviously, both are probably important in the oral presentation of material and may be especially important in rephrasing material so it is most appropriate for a particular pupil. Ideational fluency is the ability to think of many ideas to a given stimulus. Taylor found that individuals scoring in the mid-range on tests of this type were more effective communicators than those scoring at the extremes. These three fluency factors are described by Guilford as requiring the divergent production of relations, systems, and units. Carroll points out that associational and expressional fluency require searching long-term memory for appropriate lexicosemantic or lexicogrammatic instances, whereas ideational fluency involves searching experimental memory for appropriate associations.

Semantic originality, which is defined as the ability to produce remotely associated, clever, or uncommon verbal responses to a stimulus, probably

relates to teacher performance in much the same way as does ideational fluency. It seems plausible that the ability to think of remote relationships would be optimal at the mid-range for the elementary school teachers in this study (although it might be important to have higher levels of ideational fluency and originality in teacher-scholars at the university level). However, an argument could be made that teachers working with pupils having learning difficulties or coming from a different culture might be more successful if the remote relationships were more psychologically available to them. Semantic originality is described by Guilford as divergent production of semantic transformations. Carroll points out that it requires searching long-term experimental memory for unusual instances.

Two other aptitude factors selected for this study involve the ability that is popularly known as flexibility. They are spontaneous semantic flexibility, or the ability to produce diverse ideas, and semantic redefinition, the ability to think of new or different uses for objects (probably this is the polar opposite of functional fixedness). Both of these aptitudes require what is often referred to as the ability to change a mental set. It was hypothesized that these aptitudes would relate to a teacher's ability to shift to different explanations or methods when the more common approach did not seem to work. Student teachers who are flexible have been found better able to help pupils think for themselves (Hunt and Joyce, 1967). Guilford describes these aptitudes as divergent production of semantic classes and convergent production of semantic transformations. However, as was pointed out by Ekstrom (1973), these aptitudes have combined in studies outside the Guilford laboratory. Carroll has pointed out that both involve the searching of long-term experimental memory for associations.

The concept of flexibility may also be related to several of the other factors. For example, the flexibility and breadth with which a word is

defined may determine the number of words associated with it, as in the Controlled Associations Test, or the willingness to accept unusual appearing explanations for an occurrence may determine the number of remote possibilities entertained, as in the Story Surprises Test.

The last of the aptitude factors selected for this battery was sensitivity to problems, the ability to recognize problems. It was hypothesized that this factor would relate to teachers' abilities in general classroom management as well as their ability to detect pupil learning and behavioral difficulties. Guilford defines this factor as cognition or evaluation of semantic implications. As Carroll has described this factor, it involves the use of both experimental and abstract logical long-term memory to retrieve associations.

Our model also included the cognitive style, field dependence-independence. Research by Witkin and his associates has shown that a match between teacher and pupil cognitive styles facilitates learning. There is also evidence that teachers at different grade levels or teachers of different subjects also differ in cognitive style.

We also hypothesized that knowledge of the subject being taught and knowledge of teaching methods and techniques for these subjects could have an important bearing on teaching behaviors and on pupil outcomes. Our rationale for the importance of the subject being taught was that teachers who are themselves more skillful at reading and/or mathematics may be better able to model these skills for their pupils and to teach them with more enthusiasm than teachers less skillful in these areas. Knowledge of teaching skills and techniques would, we hypothesized, increase the likelihood of a teacher selecting the optimum teaching behavior to produce pupil learning.

The Research Study and Its Findings. The subjects in this study were 42 second-grade and 55 fifth-grade teachers and the pupils being taught reading and/or mathematics by each of these teachers. All of the teachers took a battery of tests including measures of the aptitude which I have just discussed, knowledge of subject and teaching, cognitive style, and attitudes toward teaching. The pupils also took tests of aptitudes, reading and mathematics achievement, cognitive style, and attitudes toward these subjects. Classroom observation allowed us to observe both teaching behaviors and pupil behaviors.

The teacher aptitude test battery, which is described in your handout, consisted of 15 unifactor tests measuring the cognitive factors known as verbal comprehension; general, inductive, and logical reasoning; associative and meaningful memory; associational, expressional, and ideational fluency; semantic originality; semantic redefinition; sensitivity to problems; and spontaneous semantic flexibility. We also included in this battery the teacher verbal ability test from the Coleman study to allow us to compare these teachers with those in other studies.

The complexity of the experimental design made it desirable to reduce the number of scores obtained from the aptitude test battery and the other teacher tests. The final derived scores and their composition are indicated in your handout. I'd like to spend a minute discussing these derived aptitude scores, since obtaining these factors presented an interesting problem.

While there was no reason to expect different aptitude patterns at the two grade levels, it was decided that the analyses for the two groups of teachers, Grade 2 and Grade 5, should be kept separate until it could be demonstrated that these aptitude factors were essentially congruent. At both grade levels there were four aptitude factors with roots greater than

one and, at each grade, these factors accounted for 63% of the variance. However, the factors were distinctly different in structure regardless of the methodology used to derive or rotate the factors. While it would have been interesting to continue exploring the relationships using these different aptitude factors, we were more concerned at this stage of our research in exploring the similarities in the aptitude-performance relationship across the two grade levels. Consequently, a target matrix based on the hypothesized structure of the aptitude test battery was used and the obtained solutions were rotated to this target. The resulting factors, indicated as the aptitude scores on your handout, all had coefficients of congruence over .90 with the target.

It would be highly desirable for us to be able to reanalyze this data, using the different aptitude factor patterns for the two grade levels to determine if these differences would further clarify our findings.

The teaching behaviors, which are described in your handout, were derived from three different sources of data on teachers' classroom behavior. Two of these are direct observational techniques, APPLE (Anecdotal Process for Promoting the Learning Experience), which was developed by Nadine Lambert, and RAMOS (Reading and Mathematics Observation System), developed by Robert Calfee. The third method was a work diary which provided indirect information on the teachers' activities. These three sources provided 136 scores for each teacher. These were reduced by grouping to 22 scores which can, in turn, be considered to belong to six distinct categories.

The four teacher aptitude scores, the cognitive style score, the two knowledge scores, and the three attitude scores were entered into a path analysis to determine their effect on the teaching behaviors. These data are presented in Tables 3 and 4 of the handout. The path coefficients

can be thought of as being comparable to partial correlation coefficients.

As can be seen from these tables, very few of the teacher aptitude factors scores showed a consistent relationship to any teaching behavior at both grade levels and for both reading and mathematics instruction.

The teacher characteristic which did show consistent relationships with instructional behavior was cognitive style, which was negatively related to the social control and management of pupil behavior, and aspirations, which was negatively related to having pupils working independently of the teacher. Thus, the field dependent teachers were more concerned with maintaining behavioral control in the classroom than were the field independent teachers.

We also found that one attitude component, level of aspiration, was consistently related to teaching behavior. Teachers with low aspirations were more likely to use a classroom structure in which the pupils worked independently of the teacher.

With these two exceptions, the analysis did not show any other teacher score which was consistently related to a teaching behavior across both grade levels and both subjects. However, there is a strong suggestion of interaction between specific teacher characteristics, especially the aptitude scores, and instructional behavior. These data suggest that teachers perceive the demands of these grades and subjects differentially and do not regard teaching as a homogeneous task. Thus, it can be hypothesized that teachers may select different teaching styles according to their perceptions of the demands of the instructional task.

One of the most dramatic of the aptitude-behavior interactions is that between the flexibility factor and instructional organization at the second

grade level. The more flexible teachers utilized a more complex classroom organization (WD-4), which implies they were more likely to have sole responsibility for instruction. These more flexible teachers tend to teach the whole class (AP-7), do less independent pupil work (AP-5) and do less instruction in groups (AP-6). I interpret this as indicating that more flexible teachers are better able to respond differentially to pupils without having to resort to using various organizational strategies (aides, groups, etc.) to produce this individualization.

Verbal fluency shows a relationship to the quality of teaching methodology while reasoning ability, as defined by these measures, seems to be negatively related to the quality of teaching behavior.

Implications. These data suggest that further research exploring the predictability of instructional behaviors from teacher aptitudes, knowledge, cognitive style, and attitudes would be promising.

In particular, we could learn from such research a great deal about how to select teachers and how to guide teachers into teaching the subject matter and/or grade level where they can have the greatest effect in terms of pupil outcomes.

Another and closely related kind of research study would involve exploring the particular type(s) of pupils with whom teachers of given aptitudes work most effectively. For example, we could explore the interaction between teacher aptitudes and pupil aptitudes as well as other pupil characteristics such as race, sex, and socioeconomic status.

As you have already heard Fred McDonald state, still another important piece of research is the degree to which teacher education -- including both preservice and in-service training, can modify teaching behaviors and the

aptitudes related to these behaviors.

This kind of research is also important in terms of teacher retention. Analysis of the aptitudes and teaching behaviors of teachers not recommended for tenure or of teachers currently underutilized might help us in identifying reassignment possibilities for them which would allow them to capitalize on their strengths.

American Association of Colleges for Teacher Education
Chicago, Illinois

February 22, 1978

HANDOUT

Relationships Between Teacher Aptitudes, Teaching Behaviors, and Pupil Outcomes

Ruth B. Ekstrom
Educational Testing Service
Princeton, New Jersey

Table 1 - Teacher Test Scores

Table 2 - Intercorrelations Among Teacher Aptitude Tests

Table 3 - Targeted Factor Analysis of Teacher Aptitude Tests

Table 4 - Teaching Behaviors

Table 5 - Path Coefficients from Teacher Aptitudes to Teaching Behaviors - Grade 2

Table 6 - Path Coefficients from Teacher Aptitudes to Teaching Behaviors - Grade 5

Table 1

Teacher Test Scores

APTITUDE SCORES:			
Verbal Fluency - A composite score, derived from a factor having its major loadings on:			
701	Verbal Facility	--	The verbal ability test used in the Coleman study. The subject is asked to select, from among five options, the best word to be used to complete a sentence.
702	Vocabulary	V-4	The subject is asked to select, from five options, the best synonym for a stimulus word.
725	Topics	FI-1	An ideational fluency test. The subject is asked to write as many ideas as possible about a given topic.
727	Controlled Associations	FA-1	An associational fluency test. The subject is asked to write as many synonyms as possible for each of several stimulus words.
728	Making Sentences	FE-1	An expressional fluency test. The subject is asked to write sentences of a designated length when the first letter of most of the words is specified.
Memory - A score derived from a doublet factor with loadings on:			
712	Picture-Number	MA-1	An associative memory test which asks the subject to recall the two-digit numbers paired with each of several pictures previously studied.
724	Sentence Completion	--	A meaningful memory test in which the subject is asked to recall the one word which has been deleted from each of several previously studied sentences.
Reasoning - A composite score derived from a factor having its major loadings on:			
713	Picture Grouping	I-3	A figure classification test. The subject is asked to determine the rule or reason which determines the assignment of a simple figure to one of two or three groups and then to indicate to which group additional figures should be assigned.
714	Nonsense Sayings	RL-1	A logical reasoning test. The subject is asked to indicate if the conclusion drawn from two preceding statements shows good or poor reasoning.
715	Inductive Reasoning	--	The subject is asked to determine the rule which relates four groups of four letters and to mark the fifth and unrelated group.
717	Mathematics Aptitude	RG-2	The subject is asked to select from five options the correct answer to simple word problems which stress reasoning and include some simple algebra.

Table 1 (con't)

Flexibility - A composite score based on a factor with its main loadings on:			
	721	Finding Useful Parts	RE-1	A test of redefinition ability. The subject is asked to select, from five options, the one object which could be used as a make-shift substitute for a specified purpose when the object usually used is unavailable.
	726	Story Surprises	O-1	A test of semantic originality. The subject is asked to write two different and surprising endings for each of several short stories.
	729	Listing Objects	XS-3	A test of semantic flexibility. The subject is asked to list as many things as possible which might be found in a specified setting.
	730	Planning Test	Sep-1	A test of sensitivity to problems. The subject is asked to indicate what is wrong with each of several plans presented for solving a variety of practical problems.
COGNITIVE STYLE:				
	723	Score on the Group Embedded Figures Test		
KNOWLEDGE SCORES:				
		Teaching Methods		Scores derived from short tests of methods of teaching reading or mathematics at the elementary school level. Some items include general theoretical background in the subject.
		Subject Matter		Scores derived from teacher performance on tests of inferential reading and decoding or of simple arithmetic computation.
ATTITUDE SCORES:				
		Aspirations		A composite score derived from six items relating to desire for leadership, recognition, and opportunities.
		Satisfaction		A composite score derived from ten items dealing with satisfaction with various aspects of the school, with teaching as an occupation, and with contacts with teachers and administration.
		Perception of Student Characteristics		A composite score derived from three items about student educational background, socioeconomic level, and difficulty in controlling students.

Table 2

Intercorrelations Among Teacher Aptitude Tests

(Grade 5 above diagonal; grade 2 below)

		701	702	712	713	714	715	717	721	724	725	726	727	728	729	730
701	Verbal Facility (Coleman)	-	.52	.13	.32	.11	.50	.42	.51	.35	.29	.46	.33	.35	.21	.50
702	Vocabulary	.52	-	.05	.27	-.09	.37	.26	.41	.05	.44	.38	.52	.42	.26	.37
712	Associative Memory	.36	.37	-	.20	.07	.26	.30	.20	.43	.10	.29	.13	.17	.23	.14
713	Picture Grouping	.25	.15	.30	-	.05	.57	.39	.35	.29	.20	.42	.24	.37	.29	.24
714	Nonsense Sayings	.33	.14	-.04	.35	-	.04	.29	-.08	.09	.22	.20	-.08	.09	.01	-.02
715	Inductive Reasoning	.29	.24	.35	.25	.45	-	.46	.58	.35	.21	.55	.47	.50	.39	.48
717	Mathematics Aptitude	.46	.42	.28	.37	.31	.48	-	.37	.16	.33	.59	.33	.35	.23	.39
721	Finding Useful Parts	.57	.38	.48	.26	.25	.29	.31	-	.36	.34	.37	.41	.33	.29	.40
724	Sentence Completion	.53	.47	.60	.37	.30	.31	.36	.47	-	.00	.19	.33	.24	.37	.27
725	Topics Test	.24	.17	.20	.08	-.13	.20	.48	.17	.13	-	.30	.32	.56	.39	.16
726	Story Surprises	.50	.29	.21	.19	.14	.27	.54	.31	.41	.07	-	.37	.45	.30	.40
727	Controlled Associations	.27	.36	.33	.19	.21	.35	.39	.19	.19	.25	.16	-	.46	.36	.44
728	Making Sentences	.28	.44	.09	-.16	.10	.32	.26	.28	.08	.17	.48	.11	-	.50	.47
729	Listing Objects	.21	.18	.22	.20	.27	.40	.26	-.03	.25	.18	.17	.41	.04	-	.19
730	Planning Test	.38	.28	.19	.24	.35	.39	.37	.51	.31	.18	.38	.09	.52	-.12	-

Table 3

Targeted Factor Analysis of Teacher Aptitude Tests

(Loadings of .30 or larger)

		Grade 2 Factors				Grade 5 Factors				Factor Target			
		I	II	III	IV	I	II	III	IV	I	II	III	I
701	Verbal Facility (Coleman)	.70				.69				1.00			
702	Vocabulary	.68				.73				1.00			
712	Associative Memory		.88				.83				1.00		
713	Picture Grouping			.67				.66				1.00	
714	Nonsense Sayings			.72				.58				1.00	
715	Inductive Reasoning			.72			.32	.71				1.00	
717	Mathematics Aptitude	.31		.71				.73				1.00	
721	Finding Useful Parts				.72				.73				1.0
724	Sentence Completion		.89				.86				1.00		
725	Topics Test	.60				.68				1.00			
726	Story Surprises				.70				.72				1.0
727	Controlled Associations	.60				.71				1.00			
728	Making Sentences	.63				.74				1.00			
729	Listing Objects				.52				.66				1.0
730	Planning Test				.73				.71				1.0
		Coefficients of Congruence				Coefficients of Congruence							
		.91	.95	.93	.91	.92	.97	.93	.91				

Table 4

Teaching Behaviors

I. Instructional Time
- Work Diary 1 - Amount of time spent preparing for and teaching reading or mathematics
- RAMOS 1 - Variety of instructional roles (high score implies more time in instructional and facilitating roles)

II. Instructional Content
- Work Diary 2 - Variety of skills taught
- Work Diary 3 - Quality of teaching methodology
- RAMOS 2 - Variety of instructional aims or purposes

III. Instructional Materials
- Work Diary 5 - Number of types of materials used
- RAMOS 3 - Variety of materials used

IV. Instructional Organization
- Work Diary 4 - Complexity of managerial structure in the classroom
- APPLE 5 - Pupils work independently of teacher
- APPLE 6 - Teacher directs pupils working in groups
- APPLE 7 - Teacher works with whole class

V. Instructional Activity
- RAMOS 4 - Time spent in instructional activities
- APPLE 8 - Organizing and facilitating the instructional process
- APPLE 9 - Unsustained behaviors monitoring the progress of pupils
- APPLE 10 - Sustained behaviors to enhance pupil understanding
- APPLE 11 - Location of teacher in the classroom (high score implies greater mobility)

VI. Teacher-Pupil Interaction
- APPLE 12 - Instructional responsiveness to individual pupils
- APPLE 13 - Responses for social control or management of pupil behavior
- APPLE 14 - Nonresponsiveness to individual pupils

Table 5

PATH COEFFICIENTS FROM SECOND GRADE TEACHERS' APTITUDES, COGNITIVE STYLE, KNOWLEDGE, AND ATTITUDES TO THEIR CLASSROOM BEHAVIORS IN TEACHING READING AND/OR MATHEMATICS

	Instructional Behaviors																	
	Time		Content			Materials		Organization				Activity					Interaction		
	WD1	R1	WD2	WD3	R2	WD5	R3	WD4	AP5	AP6	AP7	R4	AP8	AP9	AP10	AP11	AP12	AP13	AP14
READING (n=40)																			
Aptitudes																			
Verbal Fluency	--	--	.27	.33	--	--	.30	-.55	.36	.48	--	--	-.25	--	--	-.28	.49	.25	-.37
Memory	--	--	--	.57	--	--	.53	-.28	.27	--	--	.39	--	--	--	-.37	.33	--	.32
Reasoning	--	--	--	--	.27	-.77	--	--	--	-.29	--	--	--	.66	--	.26	--	--	--
Flexibility	.25	--	.38	-.43	--	.77	-.46	.52	-.92	-.49	.34	--	-.48	--	--	.34	-.25	.30	--
Cognitive Style	--	-.41	-.44	--	-.37	-.37	-.54	--	--	--	--	-.28	.25	-.60	-.46	--	-.42	-.32	--
Knowledge of:																			
Teaching Methods	.36	--	--	-.29	--	-.36	--	--	--	-.26	--	--	--	-.29	--	.44	--	--	--
Subject Matter	-.27	--	--	-.53	--	--	--	--	--	.30	-.42	--	.39	-.45	--	--	--	--	--
Attitudes																			
Aspirations	--	--	--	-.45	--	--	--	.60	-.45	--	.49	--	--	--	--	.31	--	.33	--
Satisfaction	--	-.31	-.58	.46	--	--	--	--	-.28	.36	--	--	--	--	--	--	.38	--	--
Perception of Student Characteristics	-.38	--	--	.31	--	.53	-.29	--	--	--	-.40	--	--	--	--	-.78	--	--	--
MATHEMATICS (n=41)																			
Aptitudes																			
Verbal Fluency	--	--	--	--	--	--	--	-.26	--	.32	--	--	--	--	-.33	--	--	.71	--
Memory	--	--	--	--	-.26	-.46	--	-.50	--	.51	-.31	.35	--	--	.51	.25	.46	--	-.25
Reasoning	--	.56	.42	-.99	--	--	.46	.41	--	-.27	--	--	--	.32	--	--	--	--	--
Flexibility	.59	-.30	.36	--	--	.40	-.40	.99	-.65	-.68	.86	--	-.36	--	--	--	-.36	--	--
Cognitive Style	--	-.37	--	.25	-.33	--	-.31	-.59	--	--	--	--	--	-.34	--	--	--	-.51	--
Knowledge of:																			
Teaching Methods	--	--	--	--	--	-.30	--	--	--	.79	-.61	--	--	--	--	--	.29	.27	--
Subject Matter	--	-.32	-.50	.38	--	.32	--	--	.27	--	--	--	--	-.57	--	--	-.58	--	.37
Attitudes																			
Aspirations	.33	--	--	--	--	.57	--	.67	-.36	-.54	.51	--	--	--	--	--	-.30	--	--
Satisfaction	--	--	-.30	--	--	--	--	-.93	--	.46	--	.28	--	--	--	--	--	--	-.45
Perception of Student Characteristics	-.28	--	--	.67	--	--	--	-.27	.44	--	--	--	.28	--	--	--	.31	--	.35

(Coefficients .25 or greater)

Table 6

PATH COEFFICIENTS FROM FIFTH GRADE TEACHERS' APTITUDES, COGNITIVE STYLE, KNOWLEDGE, AND ATTITUDES TO THEIR CLASSROOM BEHAVIORS IN TEACHING READING AND/OR MATHEMATICS

	Instructional Behaviors																	
	Time		Content			Materials		Organization				Activity					Interaction		
	WD1	R1	WD2	WD3	R2	WD5	R3	WD4	AP5	AP6	AP7	R4	AP8	AP9	AP10	AP11	AP12	AP13	AP14
READING (n=53)																			
Aptitudes																			
Verbal Fluency	--	-.25	.47	.71	-.44	-.73	--	--	.41	-.29	.25	--	.63	.31	--	-.43	--	--	--
Memory	-.33	--	-.26	--	--	--	--	-.34	--	--	--	--	--	--	--	--	--	--	--
Reasoning	-.29	--	-.30	-.40	--	--	--	-.54	.30	--	--	--	--	-.39	--	.28	--	.49	--
Flexibility	--	--	--	-.58	--	--	--	.31	--	--	-.37	--	-.50	--	-.29	--	-.52	--	--
Cognitive Style	-.33	--	.26	--	.45	--	--	--	-.37	--	.31	--	--	.25	.45	--	.51	-.25	--
Knowledge of:																			
Teaching Methods	.38	--	--	--	--	--	--	.34	--	.31	--	--	.28	--	.44	-.35	.30	-.31	--
Subject Matter	--	--	--	.25	--	.72	--	--	-.38	.33	--	--	-.27	--	--	.37	--	--	-.30
Attitudes																			
Aspirations	--	--	.32	--	--	--	--	.48	-.36	--	--	--	--	.40	.36	-.48	--	--	--
Satisfaction	-.35	--	--	-.29	.40	--	.38	-.32	--	-.46	--	--	--	--	-.27	.59	.29	--	.28
Perception of Student Characteristics	--	--	--	--	-.37	--	-.44	--	--	-.39	--	--	-.36	--	--	--	--	.32	--
MATHEMATICS (n=54)																			
Aptitudes																			
Verbal Fluency	--	--	.53	--	--	-.32	--	.45	--	--	--	--	--	-.25	.28	--	--	-.36	--
Memory	--	--	--	--	--	--	--	--	.28	--	--	-.26	--	.42	--	--	.34	-.29	.28
Reasoning	-.35	--	-.36	-.51	--	--	--	--	--	--	--	--	--	--	--	.47	--	.26	--
Flexibility	--	--	--	-.38	--	.29	--	--	--	--	--	--	--	-.39	-.25	--	--	.71	-.40
Cognitive Style	--	--	--	.42	--	--	--	--	--	--	--	.34	-.33	--	.60	-.25	--	-.33	.31
Knowledge of:																			
Teaching Methods	--	-.27	--	.52	--	--	--	--	--	--	--	--	--	.43	-.33	--	--	--	--
Subject Matter	--	--	--	.28	--	--	--	--	--	--	--	--	--	.40	--	--	.27	--	--
Attitudes																			
Aspirations	.27	--	--	--	-.27	--	--	--	-.25	--	.32	--	--	--	--	-.37	--	--	--
Satisfaction	--	--	--	--	--	--	.26	--	--	-.30	--	--	--	.39	--	--	.33	--	.33
Perception of Student Characteristics	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-.30	--	.43	--

(Coefficients .25 or greater)